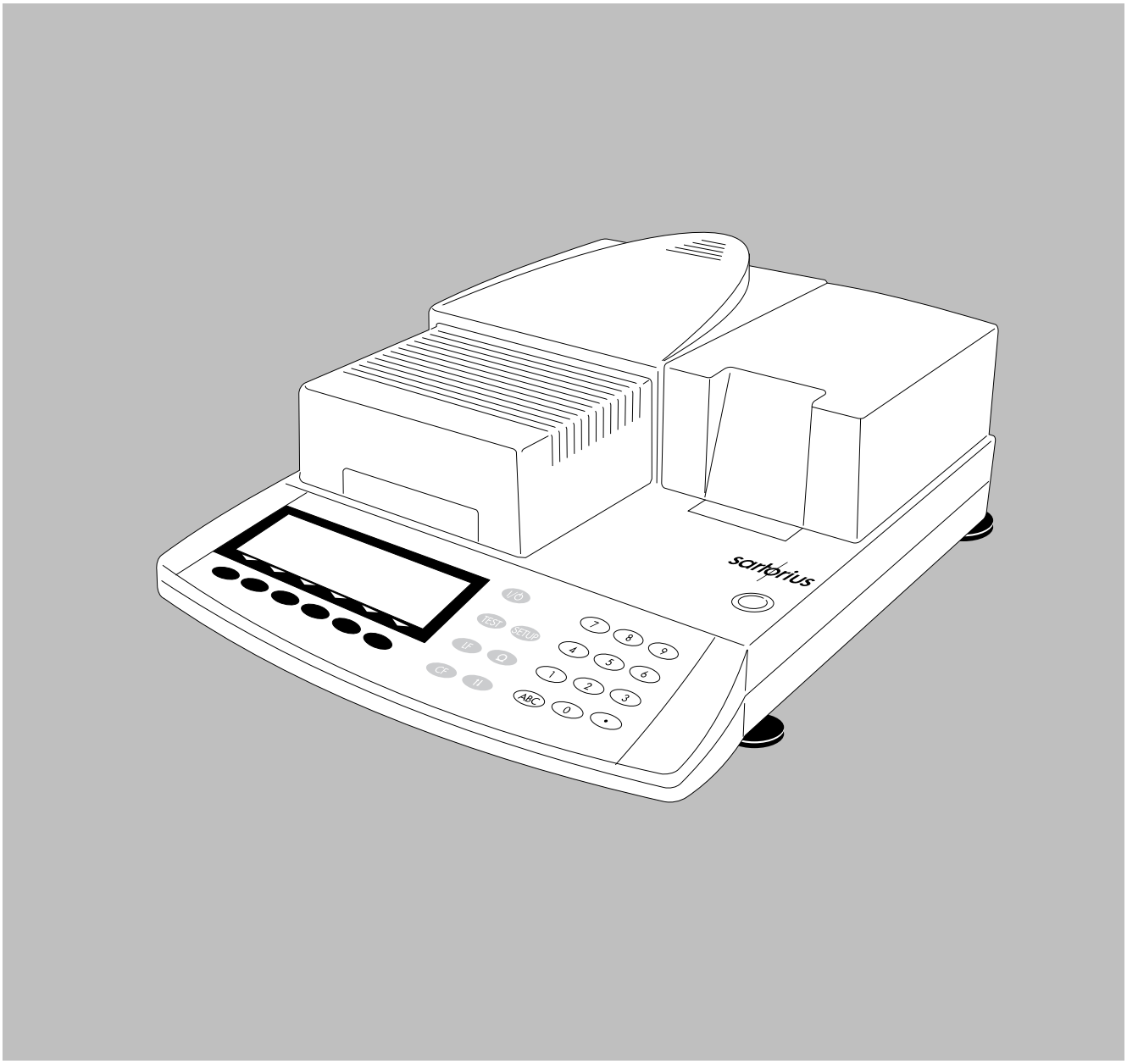
Sartorius MA Series

Service Manual
for Electronic Moisture Analyzers

Including Spare Parts List and Service Specifications



Sartorius AG, Weighing Technology

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General Information

Vital Information at a Glance

Working on Sartorius Moisture Analyzers requires experience in using analytical balances and the MA50 and MA100 Moisture Analyzers.

Please send all defective MA50/MA100 Moisture Analyzers back to the factory in Goettingen, Germany by March 31, 2000. Do not attempt to repair the units, except for replacing the heating unit or printer.

General Instructions

- First press the e key to turn off the MA50 or MA100, then disconnect the unit from AC power.
- Always unplug the AC adapter from AC power before connecting or disconnecting any cables as well as the built-in printer.

Overview of the Models

MA50H, MA50C, MA100H, MA100C
H = halogen; C = ceramic (heating unit)

Important Note:

Prerequisites for performing mechanical and electrical work on Sartorius MA models include considerable experience and completion of a service course at the main office in Goettingen, Germany. Repair work should, therefore, only be carried out by service technicians who have completed such training. Unauthorized repair work can damage the units.

Auxiliary Service Tools and Equipment

In addition to standard tools, you will need the following special tools to work on Sartorius Moisture Analyzers:

Qty.	Designation		Order no.
1	Temperature adjustment set		YTM03MA
1	SARTOCAS service software	vers. 1.38 or later	6740-33
	or		
1	PSION Server, complete	vers. 4.8 or later	

Accompanying Literature

Installation and Operating Instructions for Sartorius Moisture Analyzers
YTM03MA Temperature Adjustment Set

Service Guide

Weighing System

Activate the service mode	for external linearity adjustment; if it is necessary to designate an internal user-defined weight (SARTOCAS software/PSION unnecessary)		see page 9
Access the BPI operating mode	when working with SARTOCAS service software or PSION; to program a data set. **If the deviation is within ± 2%, check the tolerances and adjust if necessary. Otherwise, use the service software.**		see page 8
Configure the XBPI protocol	only for adjustment purposes using SARTOCAS service software		
Enter user-defined weights	during setup		see page 14
Reprotest	internal (MA100)		see page 11
Off-center load	no adjustment necessary		
Span	external span adjustment	with factory-defined (standard) weights	see page 11
		with user-defined weights	see page 12
Linearity	external linearity adjustment	with factory-defined (standard) weights	see page 13
		with user-defined weights	see page 14

Heating Unit

Replacing the heating unit	(MA50 / MA100)	2-point adjustment	see Installation and Operating Instructions
Replacing the PT1000	(MA50 / MA100)	2-point adjustment	
Adapting several moisture analyzers	(MA50 / MA100)	1-point adjustment	see Installation and Operating Instructions

Printer

Installing/ removing	printer	(MA50 / MA100)	see Installation and Operating Instructions

Maintenance (Do not perform any repairs at this time!)

Please note:

See the Installation and Operating Instructions for information on care and maintenance of the Moisture Analyzer.

Mechanical check of the weighing system

Adjust the following, if necessary:
(the procedures are the same as those for all precision balances)
- Reproducibility (see page 14 for information on the standard deviation)
- Off-center load (no adjustment necessary)
- Span (see page 11)
- Linearity (see page 13)
- Accuracy of the MA100 with the internal calibration weight

Mechanical check of the heating unit and adjustment, if required

Do the following, if necessary:
- Remove the heating unit.
- The moveable parts should be easily moveable.
- The heating chamber must be clean (see Installation and Operating Instructions).
- Carefully replace the heating unit by pushing it in until it stops.
- Connect the Moisture Analyzer to AC power and press the (I/⏻) key.
- The motorized heating unit should move forward and the glass door should close.
- If necessary, replace the heating unit (see Installation and Operating Instructions).
- Adjust the temperature as needed (1-pt./2-pt.) - see the YTM03MA temperature adjustment set.

Mechanical check of the printer

If necessary:
- Press the (⎙) key and check the printout. Replace the ribbon if necessary.

Description of the Models

The Sartorius MA50 and MA100 Moisture Analyzers are used to determine the moisture content of solid, powdered, liquid or pasty samples.

The units consist of:

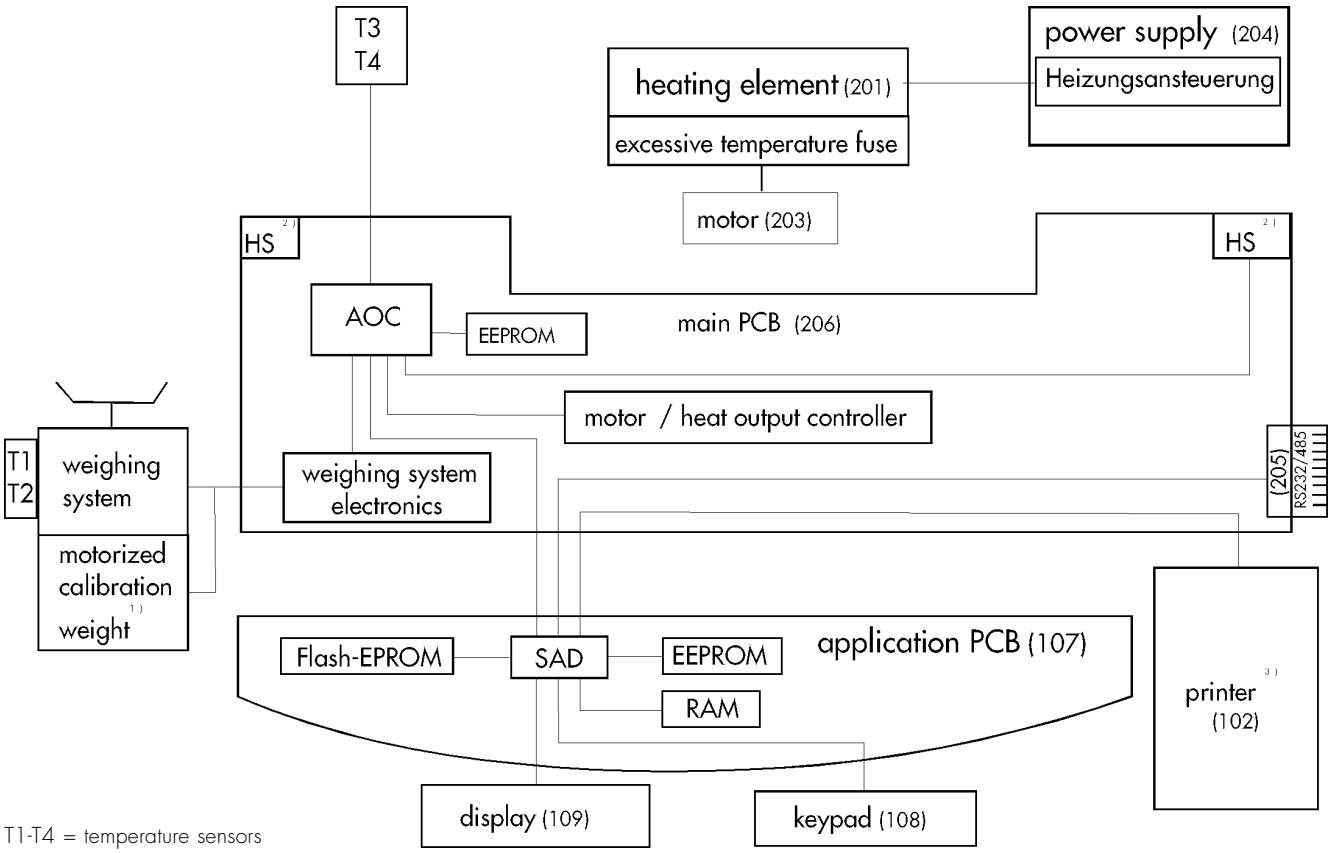
- A weighing system with a 50 g weighing capacity (MA50) or 100 g weighing capacity (MA100) and readabilities of 1 mg (MA50) and 1mg/0.1mg (MA100).
- A main PCB with the weighing system processor (AOC), various memories, controlling electronics for the heating unit, weighing system electronics and the data interface (RS232 or 485).
  All adjustment data specific to the weighing system are stored in the AOC memory, such as:
  - temperature compensation (TC) value
  - linearity value
  - calibration value

Application PCB
The following are stored on the application PCB:

EEPROM:	– setup data
	– adjustment values for temperature-related drift
	– adjustment values for temperature regulation
RAM:	– drying programs
Flash EPROM:	– operating program

Two different types of heating units are used in the Moisture Analyzers:
halogen (approx. 400 watt output; 115 or 230 volts; maximum heating temperature of 200 °C), or
ceramic (approx. 650 watt output; 115 or 230 volts; maximum heating temperature of 200 °C).

Block Diagram

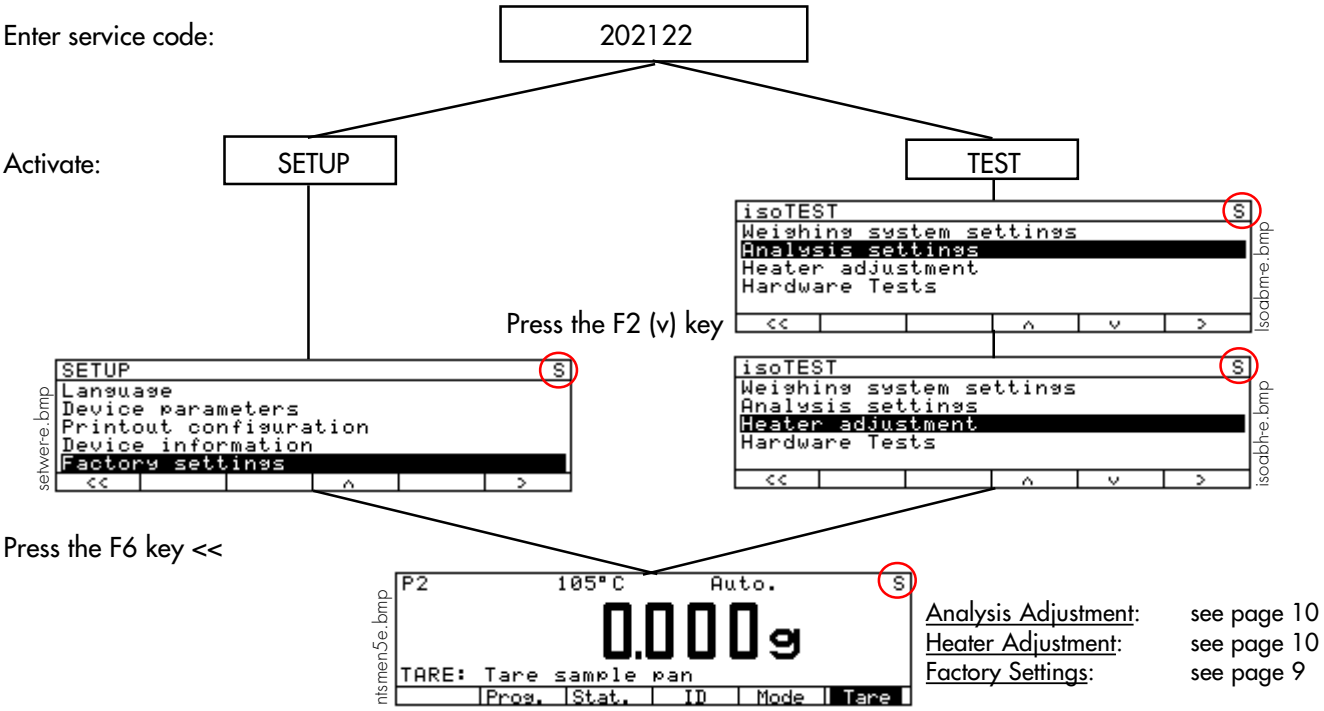


T1-T4 = temperature sensors
1) Motorized calibration weight only on MA100
2) HS: Photoelectric barrier for heating unit
3) Printer is optional
e.g. (107) see pages 38-41

Blockb1e.TIF

Menu Items for Service Only

Please note: These menu items with a black background are only accessible in the service mode.

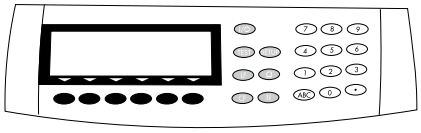


Analysis Adjustment: see page 10
Heater Adjustment: see page 10
Factory Settings: see page 9

If you toggle from the SETUP menu to the isoTest menu via the weighing mode, the „**S**" indicating service mode will remain in the display
To reset the service mode („**S**"), press the (I/⏻) key.

Handling and Operating the Moisture Analyzer

Key Functions



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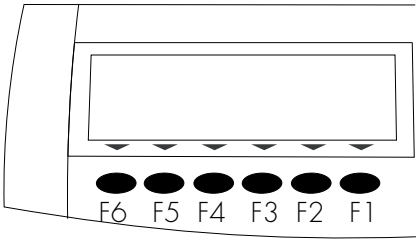

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The program assigns different functions to the 6 function keys, which are numbered from 1 to 6 from right to left (i.e., function key 1 is the > key).

(I/⏻) **On/off key**
Turns the display on or off
The Moisture Analyzer remains in the standby mode.

(TEST) **isoTest**
Weighing system is calibrated/adjusted and hardware tests are performed.

(SETUP) **Moisture Analyzer settings**
Access to the setup menu
Exit setup

(LF) **Line feed**
Printer outputs an empty line

(⊙) **Print**
Printouts/records are output to the printer and the data interface (e.g., printer)

(CF) **Clear function**
Clears the entry
Interrupts calibration/adjustment procedures in progress

(⇩⇧) **Arrow key**
Moves the motorized heating unit to open or close the sample chamber

(0) … (9) **Numeric keys**

(·,) **Decimal key**

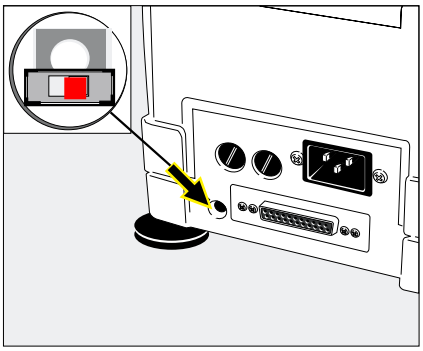
For manual entry of numbers and decimal points

(ABC) Letters
For manual entry of letters and special symbols (space, *, :, /, etc.)

Service Key and Switch Functions

Activating the BPI Operating Mode

Please note:



MA_0005.EPS

To use the SARTOCAS service software (version 1.38 or later) or the Psion server (version 4.8 or later), the weighing system must be switched into the BPI (Binary Processor Interface) operating mode (e.g., for linearity adjustment, span determination or replacement of PCBs).

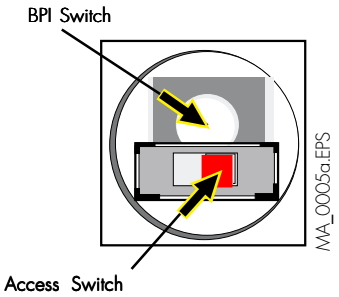
- Press the eo key to turn on the MA50 or MA100.
- Wait for completion of the startup routine (delayed power-on, test functions) until 0.000g is displayed (e.g., on the MA100).

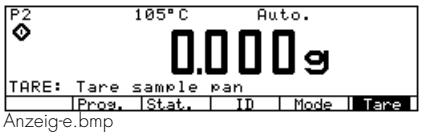
- Remove the cap to the left of the data output port on the back of the MA50/MA100.

- The BPI key can be accessed through this opening. Use a pen, for example, to press and hold the key.
- 12 V are supplied to the MODE port of the MA50/MA100 processor to cancel the write-protect feature of the internal EEPROM and place the weighing system into BPI communication mode.

- The weight readout disappears in the display.

- Wait at least 3 seconds, after which the interface is in the BPI operation mode.





Anzeig-e.bmp

- Release the BPI switch. The MA50/MA100 automatically returns to the standard weight display.

- Replace the cap on the back of the unit.

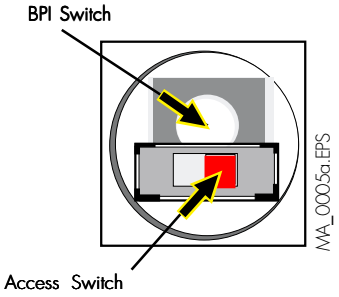
- Press the (I/⏻) key to turn the **MA50/MA100 off and on again**.
- Wait for completion of the startup routine (delayed power-on, test functions) until 0.000g is displayed (e.g., on the MA100; see above).
- The Moisture Analyzer is now ready to work in the BPI operation mode with SARTOCAS software for personal computers (version 1.38 or later) or the Psion server (version 4.8 or later).

Caution!

Once you have finished working in the **BPI** operation mode, it is **imperative** that the write-protect feature and SBI record be activated with the SARTOCAS software (version 1.38 or later) or the Psion server (version 4.8 or later).

Important Note:

While the MA50 or MA100 is in the BPI operation mode, you cannot run peripheral devices that communicate in the RS232/485 mode.
ERR 30 will be displayed when you press the (🖨) key if the built-in printer is not connected.

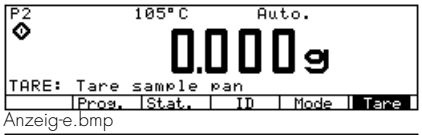


Menu Access Switch

Important Note:
The menu access switch should remain set to the right because this setting only needs to be changed on models that are verified for legal metrology.

Activating the Service Mode

The „**S**" service mode enables extensive adjustments to be made.



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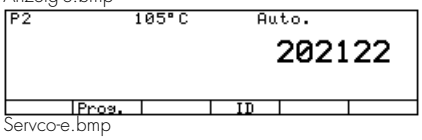
– Select the weighing mode (display shows **0.000 g** - depending on the model)



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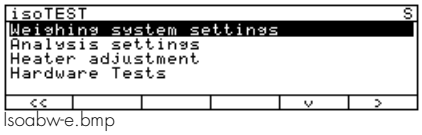
– Enter service code »**202 122**«
– Press the (SETUP) key or the (TEST) key.

Setups-e.bmp

– e.g., to access the **SETUP** menu:
– Press the (SETUP) key
– The **SETUP** menu is displayed, and „**S**" also appears in the upper right-hand corner of the display.

or, to access the **isoTEST** menu:



Isoabw-e.bmp

– Press the (TEST)
– The **isoTEST** menu is displayed, and „**S**" appears in the upper right-hand corner of the display as well.

The service mode is now activated.

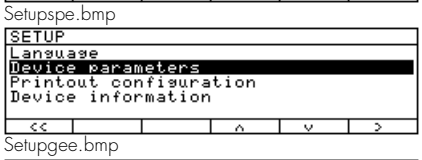
To deactivate the service mode, press the (I/⏻) key.

SETUP Menu

Anzeig-e.bmp

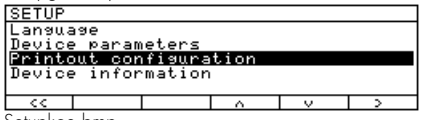
– Press the (I/⏻) key to turn on the weighing system.
– Wait for completion of the startup routine (delayed power-on, test functions).
– The readout shown on the left appears in the display (depending on the model).
– Press the (SETUP) key.
– Select the desired language:
German; English (factory setting); English with U.S. date/time format; French; Italian; Spanish

Setupspe.bmp



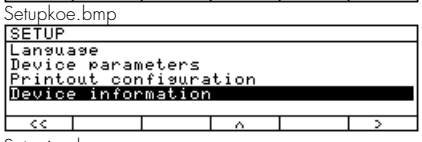
Setupgee.bmp

– Select the device parameters;
password; user ID; weighing parameters; interface; built-in printer (optional); keypad; display; clock; additional functions; factory settings



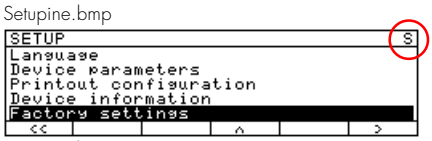
Setupkoe.bmp

– Configuring the Printer Record
Records of analyses can be configured individually (see the Installation and Operating Instructions).



Setupine.bmp

– Device Information
version no.; version no. of the weighing system; model; serial no.



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– All factory settings can <u>only</u> be set using the service code »**202 122**«
– Reset the factory settings.
– Caution !
– <u>All</u> setup data and drying programs along with the accompanying statistical data will be reset.

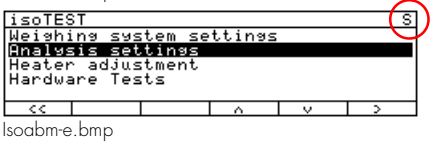
IsoTEST Menu

Anzeig-e.bmp

- Press the (I/⏻) key to turn on the weighing system.
- Wait for completion of the startup routine (delayed power-on, self test).
- The readout shown on the left appears in the display (depending on the model).
- Enter service code »**202 122**« and confirm by pressing the (TEST) key.

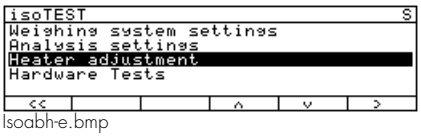
Isoabw-e.bmp

- Weighing System Settings: <u>the service mode has more functions.</u>
  (see page 10 „Adjustment Options for the Weighing System in the Service Mode“)



Isoabm-e.bmp

- Analysis Adjustment: <u>only possible in the service mode.</u>
  (Do not activate the service mode at this time - this adjustment is only possible when assembling the unit.)
  - Adjust the temperature difference compensation.



Isoabh-e.bmp

- Heater Adjustment: <u>only possible in the service mode.</u>
  (see „Adjustment Options for the Heating Unit in the Service Mode“)
  - Adjust reference - measuring channel (only possible during assembly)
  - Adjust sample chamber - measuring channel (only possible during assembly)
  - 2-point temperature adjustment (see Installation and Operating Instructions for the YTM03MA)
  - 1-point temperature adjustment (see Installation and Operating Instructions for the YTM03MA)

Isohat-e.bmp

- Hardware Tests: <u>service mode is not required.</u>
  - Interface test (see „Installation and Operating Instructions“)
  - Heating unit test (see „Installation and Operating Instructions“)

Adjustment Options for the Weighing System (isoTEST of the Weighing System)

Adjustments marked with * can <u>only</u> be made in the service mode:

Isotes1e.bmp

Isotes2e.bmp

Isotes3e.bmp

Isotes4e.bmp

Isotes5e.bmp

Ext... calibration/adjustment. factory-defined (standard) weights	– External span adjustment with default weight
Ext. calibration/adjustment; user-defined weights	– External span adjustment with user-defined weight (enter in the input mode)
Internal calibration/adjustment	– Internal span adjustment
Ext. linearity adjustment; *	– External linearity adjustment with default weight
factory-defined (standard) weights *	
Ext. linearity adjustment; user-defined weights *	– External linearity adjustment with user-defined weight (enter in the input mode)
reproTEST	– Test of the reproducibility (MA100 only)
Designate internal weight *	– Overwrite internal calibration weight
Designate user-defined weight *	– Determine and store value of external weight (user-defined)
Weighing only	– weighing mode
Weighing, display *10 *	– Resolution increased by one digit and Superrange function activated

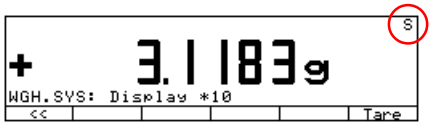
Please note:
It is normally not necessary to adjust the MA100 or MA50 using service software (PSION server or SARTOCAS) because all required adjustments can be made in the service mode.
If the adjustments lie outside of the allowable tolerances by more than ± 2%, it is necessary to adjust the unit using the service software (e.g., replacement of a PCB or repair to the weighing system).

reproTEST (MA100 only)

lsorep2e.bmp

- After accessing the "**isoTest**" function for the weighing system, select the menu item "**reproTest**" and press **F1** (>) to confirm.
- "**=WGH. SYS: reproTEST**" is displayed.
- A test of the reproducibility of the mechanical system and the motorized internal calibration weight is performed.
- The internal calibration weight is placed on the weighing system, measured and removed 6 times.
- At the end of the routine, the reproducibility is displayed, and if a printer is connected, a record is generated (see the Installation and Operating Instructions).

High Resolution - Display * 10 (only possible via service code)



lsowi10e.bmp

- Activate the service mode (see page 9).
- After accessing the "isoTest" function for the weighing system, select the menu item „**Display * 10**" and confirm by pressing the **F1** (>) key.
- "**=WGH. SYS: Display *10**" is displayed.
- One additional digit appears in the display.

Weighing Only

lsowie2e.bmp

- After accessing the "isoTest" function for the weighing system, select the menu item „**Weighing**" and confirm by pressing the **F1** (>) key.
- "**=WGH. SYS:**" is displayed.
- The Moisture Analyzer will now operate only in the weighing mode.

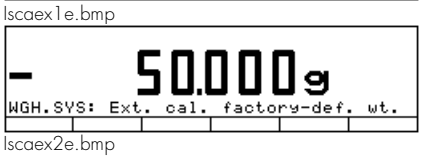
External Span Adjustment

External span adjustment must be performed if the span lies outside of the tolerance limit.
This can be done in several ways:

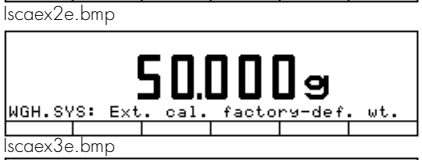
You can use the Sartorius SARTOCAS service software (version 1.38 or later) to adjust the span (PSION server, version 4.8 if the deviation is greater than ± 2%), or you can proceed as described in this service manual.

External Span Adjustment with Factory-Defined (Standard) Weights

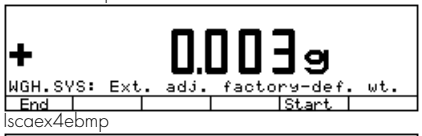
lscaex1e.bmp



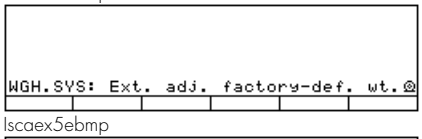
lscaex2e.bmp



lscaex3e.bmp



lscaex4ebmp



lscaex5ebmp

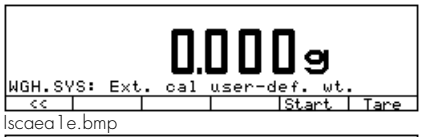
lscaex6ebmp

- Turn on the MA50/MA100, wait for completion of the self test, and allow the unit to warm up.
- After accessing the "**isoTest**" function for the weighing system, select the menu item „**Ext. cal./adj.; factory-defined weight**" and confirm with the F1 (>) key.
- "**=WGH. SYS:Ext.cal./adj.:factory-def.wt.**" is displayed. Zero the display, if necessary (by pressing the **F1** (TARE) key), and press the **F2** (Start) key to initiate external span adjustment.
- The required factory-defined (standard) weight is displayed (Bild lscaex2e.bmp).
- Center the required factory-defined weight on the weighing pan.
- The weight is acceptable if it is not preceded by a "+" or "-" (Bild lscaex3e.bmp).
- Wait until the difference (e.g., -0.001g) is displayed. "Calibration" then appears in the display.
- Press the **F2** (Start) key (Bild lscaex4e.bmp). "Adjustment" appears in the display.
- After external span adjustment has been completed, a record is generated by the printer (see Installation and Operating Instructions).
- Press the **F6** (<<) key twice and the weighing mode is displayed. (Bild lscaex6e.bmp).

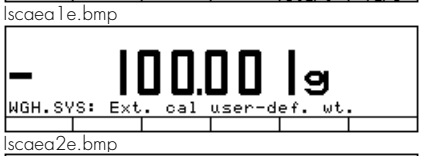
External Span Adjustment with User-Defined Weights

Please note:

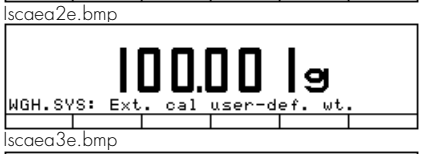
User-defined weights must first be entered via the SETUP menu (see "Weighing Parameters" on page 19).



lscaea1e.bmp



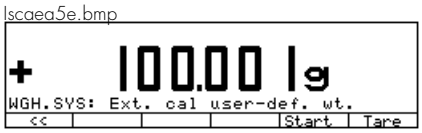
lscaea2e.bmp



lscaea3e.bmp

lscaea4e.bmp

lscaea5e.bmp



lscaea6e.bmp

– Turn on the MA50/MA100, wait for completion of the self test, and allow the unit to warm up.
– After accessing the "isoTest" function for the weighing system, select the menu item **„Ext. cal./adj.; user-defined weight"** and confirm with the **F1** (>) key.
– „=WGH.SYS:Ext.cal./adj.:user-def.wt." is displayed. If necessary, zero the display (by pressing the **F1** (TARE) key), and press the **F2** (Start) key to begin external span adjustment.
– The required weight is displayed (Bild lscaea2e.bmp).
– Center the required weight on the weighing pan.
– The weight is acceptable if it is not preceded by a "+" or "-". (Bild lscaea3e.bmp).
– Wait until the difference (e.g., -0.001g) is displayed. "Calibration" then appears in the display.
– Press the **F2** (Start) key. (Bild lscaea4e.bmp) "Adjustment" is displayed.

– After external span adjustment has been completed, a record is generated by the printer (see Installation and Operating Instructions).

– Press the **F6** (<<) key twice and the weighing mode is displayed.

Designating a User-Defined Weight as the Calibration Weight

The user can define a weight to be used for calibration.
The value of this weight is automatically changed at the completion of this routine and under the menu item "Cal./adj. wt." in the input mode of the SET-UP menu.

lsbean1e.bmp

lsbean2e.bmp

lsbean3e.bmp

lsbean4e.bmp

lsbean5e.bmp

lsbean6e.bmp

– Turn on the MA50/MA100, wait for completion of the self test and allow the unit to warm up.
– Activate the service mode, if necessary (see page 9).
– After accessing the "isoTest" function for the weighing system, select the menu item "user-defined weight" and confirm by pressing the **F1** (>) key.
– „=WGH.SYS:user-def.wt." (Bild lsbean1e.bmp) is displayed. If necessary, zero the display (using the **F1** (TARE) key) and press the **F2** (Start) key to begin.
– The calibration weight last stored (in the SETUP menu) is displayed.
– Center the weight to be defined on the weighing pan.

– You can accept and store the new user-defined weight by pressing the F2 key (press the CF key to cancel the procedure).
– Afterwards, the zero point is automatically requested again (Bild lsbean4e.bmp).
– At the end of the routine, a record is generated by the connected printer.

– Remove the weight from the weighing pan.

– Press the **F6** (<<) key twice and the weighing mode is displayed.
– The motorized heating unit closes the sample chamber.

External Linearity Adjustment

External linearity adjustment must be performed if the linearity lies outside of the tolerance.

This can be done in various ways:

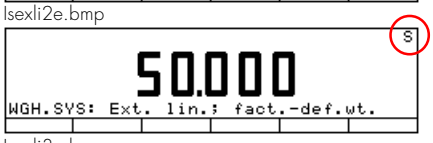
1. You can use the Sartorius SARTOCAS service software (version 1.38 or later) to adjust the linearity (PSION server, version 4.8 if the deviation is greater than ± 2%), or
2. access the service mode of the MA50/MA100 as described in this service manual.

External Linearity Adjustment with Factory-Defined (Standard) Weights (Factory Setting)

lsexli1e.bmp

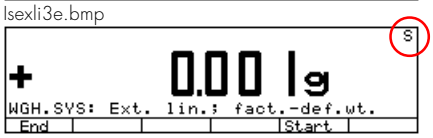
- Reactivate the service mode (see page 9).
- Select the menu item „ **Ext.lin.adj.-factory-def.wt.**" and begin the procedure by pressing the **F1** key.
- Tare the unit, if necessary, and press the **F2** (Start) key to start the linearity adjustment routine.
- The first required weight for linearity adjustment is displayed.
- Center the required weight on the weighing pan.

lsexli2e.bmp



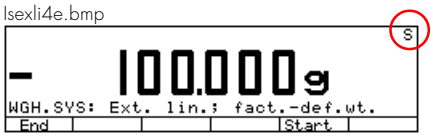
lsexli3e.bmp

- The weight is acceptable if it is displayed without a "+" or "-". (Bild lsexli3e.bmp).
- Wait until the difference (e.g., -0.001 g) is displayed. "Calibration" then appears in the display.
- Press the **F2** (Start) key. (Bild lsexli4d.bmp) "Adjustment" is displayed.



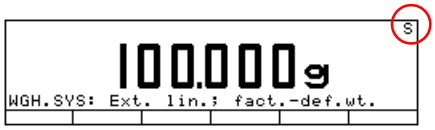
lsexli4e.bmp

- The second weight required for linearity adjustment is then displayed (Bild lsexli5e.bmp).



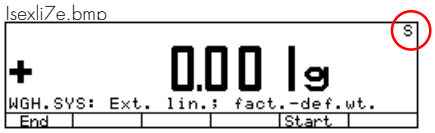
lsexli5e.bmp

- External linearity adjustment continues.
- The weight is acceptable if it is displayed without a "+" or "-". (Bild lsexli7e.bmp).



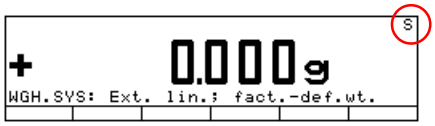
lsexli7e.bmp

- Wait until the difference (e.g., + 0.001 g) is displayed.
- Press the **F2** (Start) key (Bild lsexli8e.bmp).



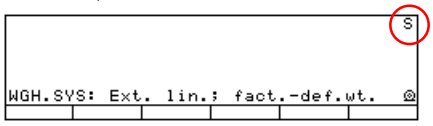
lsexli8e.bmp

- The zero point is requested (remove the weight from the weighing pan).
- This concludes the linearity adjustment sequence.



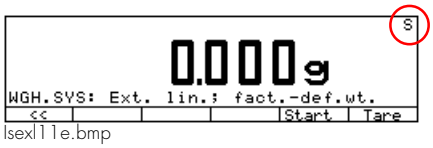
lsexli9e.bmp

- If a printer is connected to the Moisture Analyzer, a record is generated (Bild lsexl10e.bmp).



lsexl10e.bmp

- To end the linearity adjustment routine, press the **F6** (<<) key.



lsexl11e.bmp

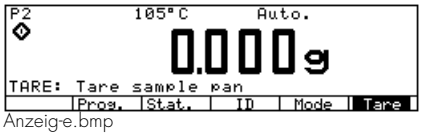
- If you press the **F6** (<<) key again, „**S**" disappears in the display (indicating that the service mode has been deactivated).

External Linearity Adjustment with User-Defined Weights

You can enter up to 4 (conventional) weight values for linearity adjustment.

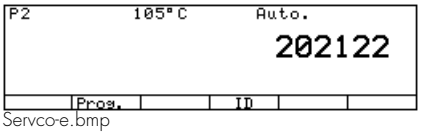
In this case, proceed as follows:

Entering Weights for Linearity Adjustment



Anzeig-e.bmp

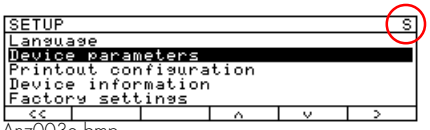
– Press the (I/⏻) key to turn on the weighing system.
– Wait for completion of the startup routine (delayed power-on, self test).
– The readout shown on the left is displayed (e.g., on the MA100).



Servco-e.bmp

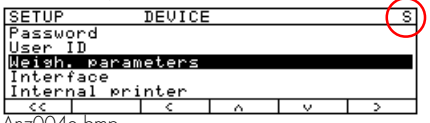
– Enter service code »**202 122**« and press the (SETUP)

The SETUP menu is displayed, and „**S**" also appears in the upper right-hand corner of the display.



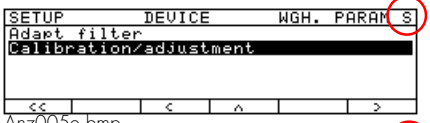
Anz003e.bmp

– Highlight the menu item **=Device parameters"** and press the **F1** key.



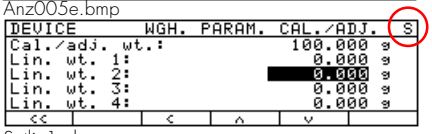
Anz004e.bmp

– Use the **F2** key to highlight the menu item **=Weigh. parameters"** and press the **F1** key.



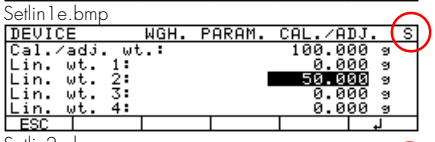
Anz005e.bmp

– Highlight the menu item **=Calibration/Adjustment"** using the F2 key and press the **F1** key.



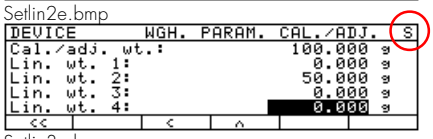
Setlin1e.bmp

– Press the F2 key to toggle to the menu item „**Lin. wt. 2,**" for example.



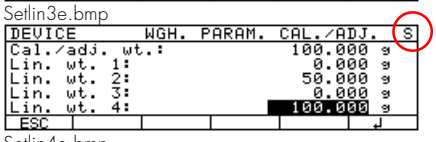
Setlin2e.bmp

– Using the numeric keypad, enter the calibration weight value, including any necessary decimal point, for the first linearity checkpoint based on the value indicated on the certificate that accompanied the weight. Then press the **F1** key to store the weight.



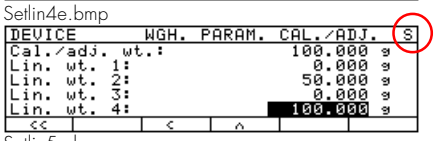
Setlin3e.bmp

– Press the **F2** key to toggle to the menu item „**Lin. wt. 4,**" for example.



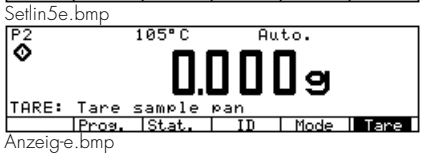
Setlin4e.bmp

– Using the numeric keypad, enter the calibration weight value, including any necessary decimal point, for the first linearity checkpoint based on the value indicated on the certificate that accompanied the weight. Then press the **F1** key to store the weight.



Setlin5e.bmp

– After you have defined all linearity checkpoints, press the **F6** key to store the entries and exit the "Calibration/Adjustment" mode.



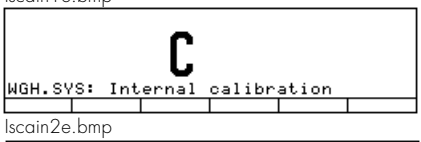
Anzeig-e.bmp

– The unit then returns to the weighing mode.

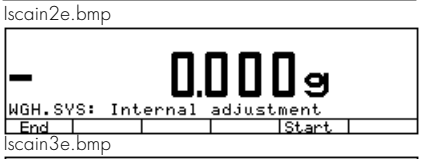
Internal Span Adjustment

The MA100 is equipped with an internal calibration weight.

lscain1e.bmp



lscain2e.bmp



lscain3e.bmp

lscain4e.bmp

lscain5e.bmp

lscain6e.bmp

- Turn on the MA100, and wait for completion of the self test.
- After accessing the "isoTest" function for the weighing system, select the menu item **„Int. cal./adj."** and confirm by pressing the **F1** (>) key.
- **=WGH. SYS: Int. cal./adj.**" is displayed
  Zero the display, if necessary (by pressing the **F1** (TARE) key, and press the **F2** (Start) key to begin the internal span adjustment sequence.
- The motorized internal calibration weight is automatically placed on the weighing system, and the difference from the last span adjustment is displayed.
- If the deviation is greater than the tolerance, press the **F2 (Start)** key to begin the adjustment process, or press **F6 (End)** to cancel.
- The zero point is automatically requested again at the end of the routine.
- Once the internal span adjustment sequence has been completed, a record is generated by the connected printer (see the Installation and Operating Instructions).
- Press the **F6** (<<) key to end the span adjustment routine.
- Press the **F6** (<<) key again, and the display shows the weighing mode.

Overwriting the Internal Calibration Weight

lsbein1e.bmp

lsbein2e.bmp

lsbein3e.bmp

lsbein4e.bmp

lsbein5e.bmp

lsbein6e.bmp

- Turn on the MA100, wait for completion of the self test, and allow the unit to warm up.
- Activate the service mode (see page 9).
- After accessing the "isoTest" function for the weighing system, select the menu item **„Define internal weight**" and confirm by pressing the **F1** (>) key.
- **=WGH. SYS: def. int. wt.**" is displayed. Zero the display, if necessary (by pressing the **F1** (TARE) key), and press the **F2** (Start) key to begin the overwrite procedure.
- This initiates the overwrite routine.
- Wait until the difference (e.g., *0.005* g) is displayed.
- Press the **F2** (Start) key.
- At the end of the procedure, the zero point is automatically requested again.
- A record is generated by the connected printer at the conclusion of the overwrite routine.
- Remove the weight from the weighing pan.
- Press the **F6** (<<) key twice, and the weighing mode is displayed.
- The motorized heating unit closes the sample chamber.

Error Codes

Depending on the type of error, error codes are displayed either temporarily or long-term in the main display or in the text line.

Display	Type of Error	Explanation	Remedial measures
No segments appear on the display		No AC power is available. The power cord is not plugged in. Fuses are defective.	Check the AC power supply. Plug in the power cord. Replace the fuses.
H	D	The load exceeds the weighing capacity; Weight on the pan is too heavy; Weighing system improperly calibrated Preload adjusted incorrectly	Ensure that operator error is not the cause. If the error continues, perform external calibration/adjustment or adjust the preload.
L	D	The load is too light; Weighing pan is not in place, Weighing system improperly calibrated or preload adjusted incorrectly.	Ensure that operator error is not the cause. If the error continues, perform external calibration/adjustment or adjust the preload.
Err 01 0 Display range	D	Data output not compatible with data output format	Calculated result from application
Err 02 Cal. n. possible	T	Zero point error at the start of the CAL routine	Calibrate only when zero is displayed; press the TARE key to tare; zero point is outside of the tolerance.
Err 03 cal./adj. interrupt	T	Zero point error at completion of CAL routine	Weighing system drifted during adjustment process
Err 06 wt. defective	T	Built-in calibration weight is defective or missing	Check the motorized calibration weight, send back to factory, if necessary.
Err 07 function blocked	T	Function or command not allowed on models certified for legal metrology	Incorrect operating procedure
Err 08 <>zero range	T	Error when display is zeroed (value outside of 2%)	Incorrect operating procedure
Err 09 < 0 not allowed	T	TARE error (tare value <= 0)	Incorrect operating procedure
Err 10 Tare function blocked	T	Tare 1 blocked if 2nd tare	The tare functions are blocked memory is fullagainst one another.
Err 11 Tare2 blocked	T	Tare memory not allowed (tare value exceeds the weighing range)	The weight displayed was e.g., negative, check the sample.
Err 12 Tare2 > MAX	T	Tare value 2 exceeds allowable range Tare value 2 must be corrected.	Entry for tare value 2 too large.
Err 17 Cal./Adj. wt. > MAX	T	With preload in place: requested calibration weight is heavier than overflow value	
Err 18 Preload too light	T	The preload to be stored is too light	Preload value is negative
Err 19 Preload too heavy	T	The preload to be stored is too heavy	Preload value is positive

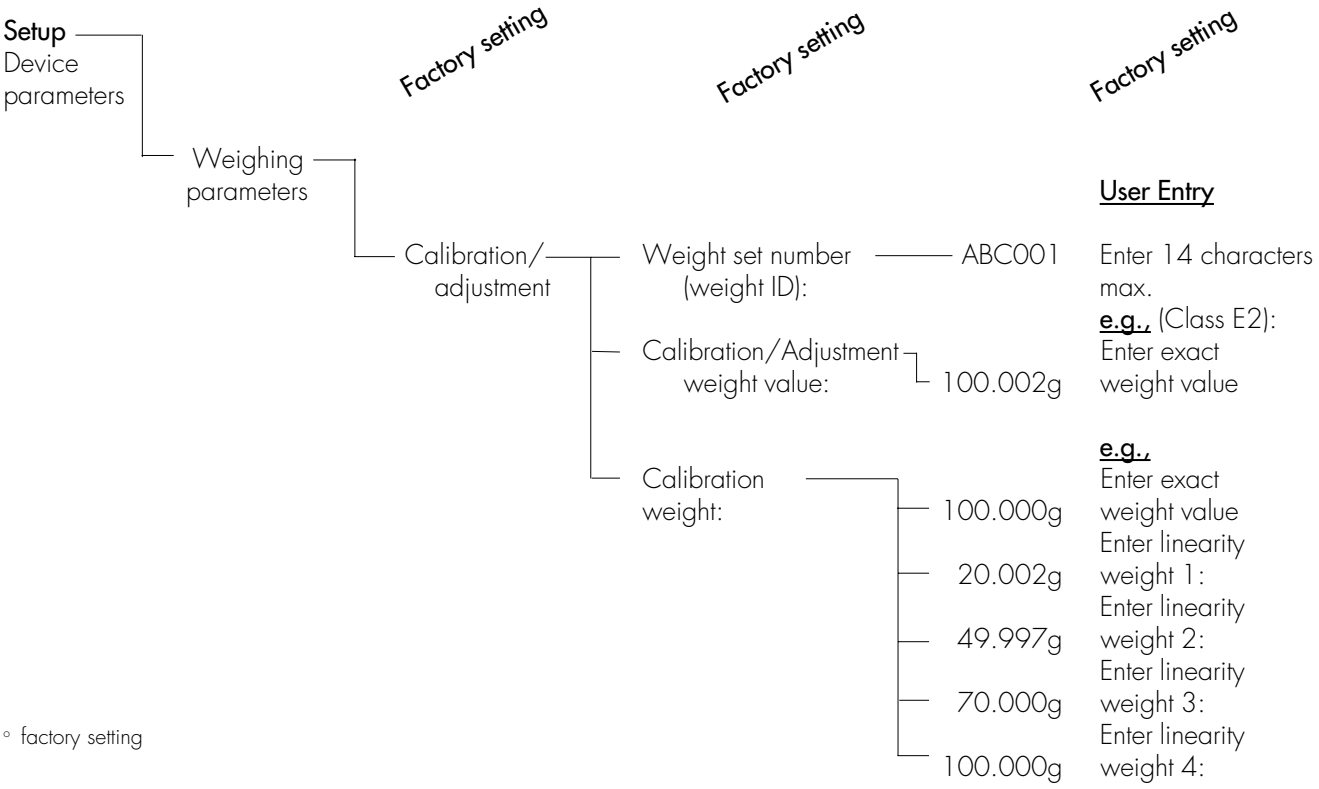
D.: dynamic error, remains in display as long as error exists
T.: temporary error (e.g., operator error) displayed approx. 2 seconds
F.: fatal error, displayed until (I/⏻) key is pressed.

Display	Type of Error	Cause	Solution
Err 30 Print fct blocked	T	Interface port for printer output is mode blocked; XBPI comm. mode is activated	Switch to the SBI communication or built-in printer is defective
Err 31 Print fct blocked	T	External device not ready to send (interface handshake interrupted) XOFF, CTS	Transmit XON, then CTS
Err 50 No weight displayed	D	Converter error (temp. comp. range) or the temperature converter for IC;	Check the sensor for temp. compensation replace main PCB or send to factory
Err 51 No weight displayed	D	Explosion-proof model: voltage error	
Err 53 No weight displayed	D	Temperature sensor not functioning sation, power cord, TKS or AOC ; (4 measuring channels)	Check the sensor for temp. compen- replace main PCB or send to factory
Err 54 No weight displayed	D	Weight converter output under the minimal limit	Load too light, place the weighing pan, on the unit; check the weighing system
Err 55 No weight displayed	D	Weight converter output over the maximum limit	Load exceeds capacity; check the weighing system
Err 101,102,103 or 104 "Checkerboard" pattern displayed continuously	D	Key is stuck Key pressed when switching on the Moisture Analyzer (SETUP) key was pressed when turning on the Moisture Analyzer or is stuck	Release key or Replace the keypad overlay; Short circuit in the application PCB
Err 220	F	ROM checksum error; data in internal ROM of the weighing system processor (AOC) are erroneous.	Save the data; replace the AOC or the main PCB.
Err 225	F	Contents of internal EEPROM not compatible with software version	Save the appropriate data set on the weighing system
Err 230	F	RAM read/write error; access to the internal RAM of the weighing system processor (AOC) is corrupt or impossible.	Save the data; replace the AOC or the main PCB.
Err 231	F	IIC BUS error	Check the IIC bus; replace the ext. EEPROM or PUMUCL
Err 236/237	F	EEPROM checksum error in linearity area; linearity of the weighing system has not yet been adjusted or the data in the internal EEPROM of the weighing system processor (AOC) are erroneous	Overwrite the erroneous data set with PSION SERVER CAS vers. 4.8 or SARTOCAS vers. 1.38 or later. Afterwards, "Linearity adjustment" and "External calibration/adjustment" routines must be run.
Err 238/239	F	EEPROM checksum error in linearity weight area; the factor stored for the internal weight for linearity adjustment is not within the allowable tolerance or is defective.	Access and run the function to overwrite the weight for linearity adjustment.
Err 240/241	F	EEPROM checksum error in fixed area; data for the weighing system operating menu in the internal EEPROM of the weighing system processor (AOC) are erroneous.	Overwrite the erroneous data set with PSION SERVER CAS vers. 4.8 or SARTOCAS vers. 1.38 or later. If the error still exists, replace the AOC or the main PCB.

Display	Type of Error	Cause	Solution
Err 242/243	F	EEPROM checksum error in menu area; non-changeable data in the internal EEPROM of the weighing system processor (AOC) are erroneous.	With the menu access switch in the "open" position, access the menu. Exit the menu and store by pressing the << key: This corrects the checksums.
Err 245	F	EEPROM checksum error in calibration area (zero point). The weighing system has not yet been calibrated/adjusted, or data in the internal EEPROM of the weighing system processor are erroneous.	Calibrate/adjust the weighing system
Err 246/247	F	EEPROM checksum error in calibration area (sensitivity). The weighing system has not yet been calibrated/adjusted, or data in the internal EEPROM of the weighing system processor are erroneous.	Calibrate/adjust the weighing system
Err 248/249	F	EEPROM checksum error in calibration weight area; the factor stored for the internal calibration weight lies outside of the allowable tolerance or is erroneous.	Access the function to overwrite the internal calibration weight.
Err 254/255	F	Checksum error at preload	Check the preload
Err 261	F	Checksum error in ext. EEPROM	Check the EEPROM
Err 262	F	Version error in ext. EEPROM	Check the version number
Err 320	F	Operating program memory is defective	Reload the operating program.
Err 340	F	EEPROM and built-in battery RAM were initialized: all system and	New EEPROM version (device and adjustment parameters) after changing
		weighing program parameters have	the operating program or IIC bus or
		been reset to the factory settings.	IIC EEPROM error; perform 2-point adjustment of heating unit and the temperature difference compensation.
Err 341	F	Built-in battery RAM was initialized: weighing program parameters have been reset to factory settings	New version of built-in battery RAM after changing operating program; data lost due to drained battery or RAM is defective.
Err 342	F	Same as Err 340, except that adjustment parameters remain stored	New EEPROM version (device parameters) after changing operating program
NO WP	D	No communication between operating unit and system	Check the weighing system
FE x xxx	F	Operating system error in Goettingen, Germany	Contact Sartorius Service Support

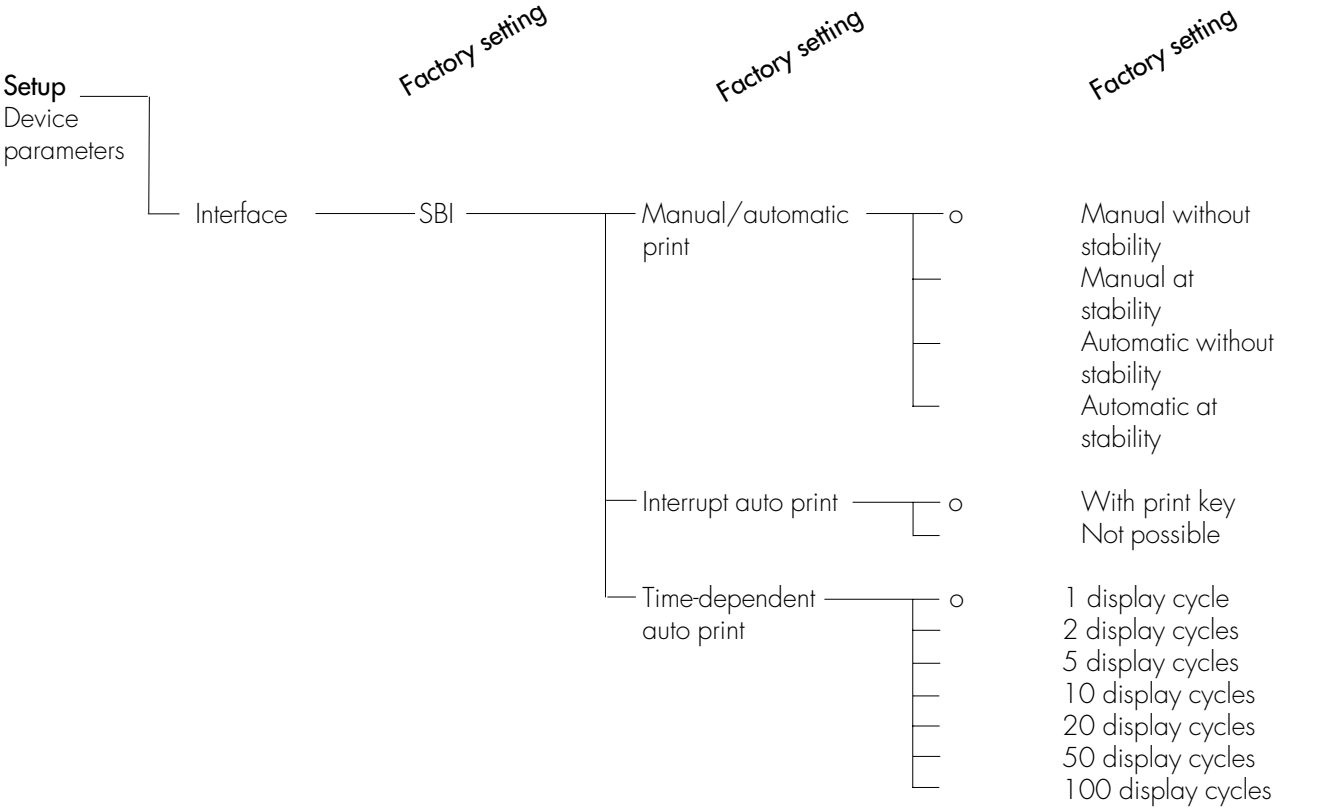
Weighing System Operating Menu Settings

Weighing Parameters (that can only be changed via service code)



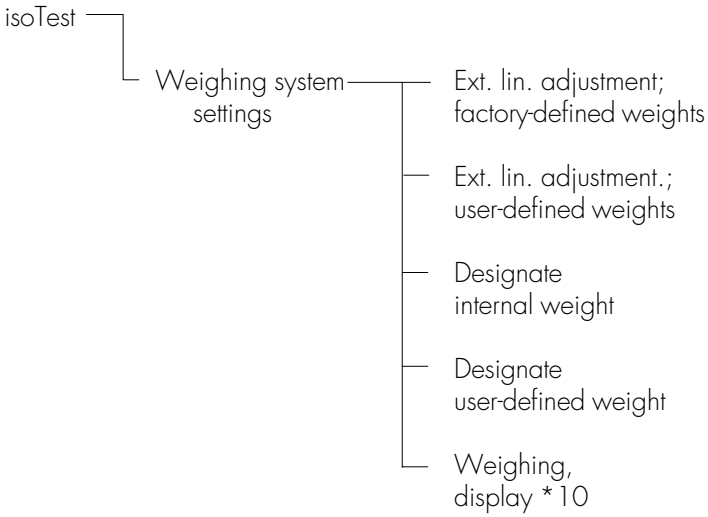
◦ factory setting

Interface (parameters that can only be changed via service code)

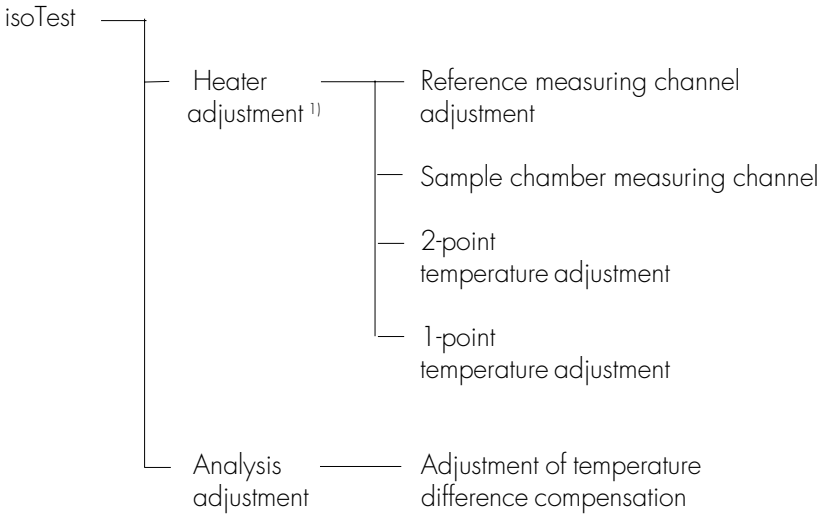


◦ factory setting

Weighing System Settings (parameters that can only be changed via service code)

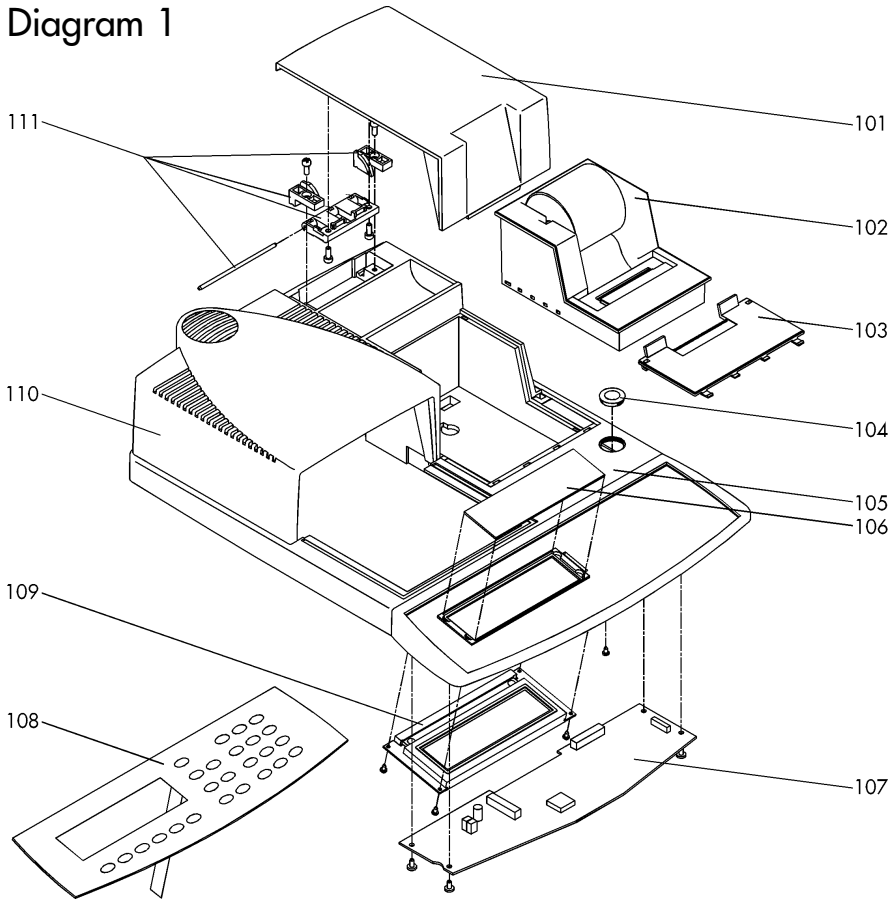


Heater/Analysis Adjustment (partial menu overview available via service code)



1) only accessible to the user if the weighing system is unloaded

Exploded-View Diagram 1



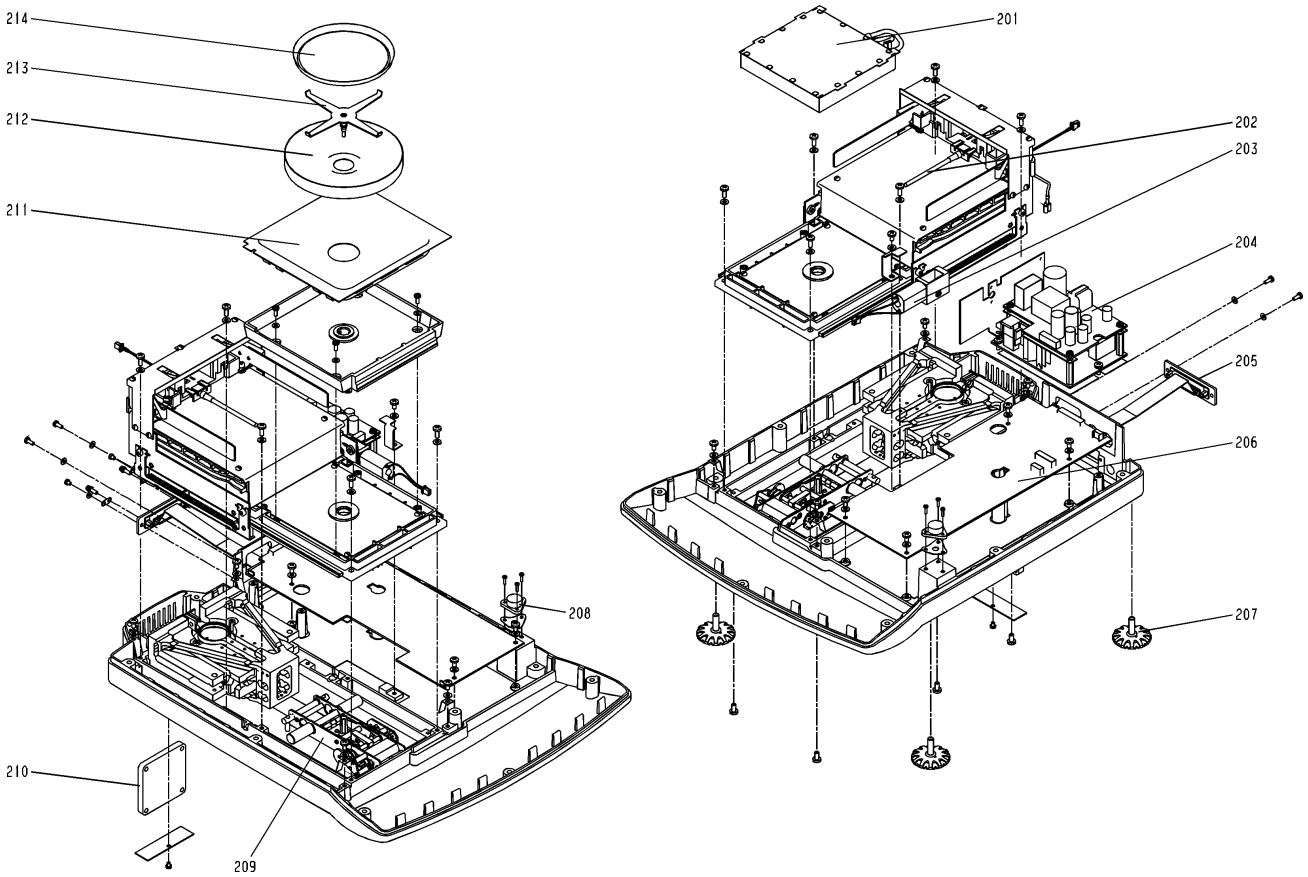
MA501001.TIF

Spare part list 1

Index	Description Status 28.10.1999	Piece per unit	MA 100 C - 000230V1	MA 100 C - 000115V1	MA 50 C - 000230V1	MA 50 C - 000115V1	MA 100 H - 000230V1	MA 100 H - 000115V1	MA 50 H - 000230V1	MA 50 H - 000115V1
101	Cover for data print	1	69MA0167							
103	Pull off plate	1	69MA0099							
104	Cover for spirit level	1	69B12149							
105	Hood with switch foil	1	69MA0174							
106	Glass plate (display)	1	69MA0173							
107	Aplication PCB	1	69MA0170							
108	Switch foil	1	69MA0172							
109	Display modul (LCD/backl.)	1	69MA0171							
110	Hood (heating element)	1	69MA0165							
	Set of glass plates with supp.	1	69MA0162							
	Fuse (temperature)	1	69MA0163							
111	Holder for Cover (printer)	1	69MA0168							
	Protecting cover	1	6960 MA01							
	Option:									
102	Printer	1	YDP01MA							
	Printer paper 50m (5 pieces)	1	6906937							
	Printer ribbon cass.	1	6906918							
	PCB with print mechanism	1	69Y03197							

MA50100A.XLS

Exploded-View Diagram 2



Spare part list 2

Index	Description Status 28.10.1999	Piece per unit	MA 100 C - 000230V1	MA 100 C - 000115V1	MA 50 C - 000230V1	MA 50 C - 000115V1	MA 100 H - 000230V1	MA 100 H - 000115V1	MA 50 H - 000230V1	MA 50 H - 000115V1
201	Heating element	1	69MA0095	69MA0096	69MA0095	69MA0096	69MA0097	69MA0098	69MA0097	69MA0098
	Heating, ceramics, 230V	1	69MA0177		69MA0177					
	Heating, ceramics, 115V	1		69MA0182		69MA0182				
	Heating, halogen, 230V	1					69MA0178		69MA0178	
	Heating, halogen, 115V	1						69MA0181		69MA0181
	Ceran plate	1						69MA0179		
	Reflector	1						69MA0180		
202	Temperature sensor	1				69MA0164				
203	Motor with gear	1				69MA0176				
204	Power supply	1				69MA0169				
205	Data output	1				69LP0017				
206	Main PCB	1	69MA0184	69MA0184	69MA0185	69MA0185	69MA0184	69MA0184	69MA0185	69MA0185
207	Leveling foot	4				69MA0091				
208	Spirit level	1				69B20028				
209	Weight switching without weigt	1	69MA0175	69MA0175			69MA0175	69MA0175		
210	Filter	1				69MA0094				
211	Tray cornered	1				69MA0166				
212	Shield ring	1				69MA0093				
213	Pan support	1				69MA0092				
214	Sample dishes (80 pieces)	1				6965542				
251	Strain gauge	1			69MA0183	69MA0183			69MA0183	69MA0183

MA50100A.XLS

Service Specifications

Model	Weighing capacity	Readability	Reproducibility		Off-center load Eccentricity		TCS
			Test weight	Permissible tolerances	Test weight	Permissible tolerance (±)	ppm/K
MA50C MA50H	50 g	0,001 g	20 g	0,002 g	50 g	0,005 g	3,3
MA100C MA100H	100 g	0,001 g	50 g	0,001 g	50 g	0,003 g	1

Model	Span				Linearity		
	Class	Adjustm. weight	Test weight	Permissible tolerance (±)	Tareweight	Testweight	Permissible tolerance (±)
MA50C MA50H	F2	50 g	50 g	0,002 g	--- g *(20)*	10/25/40/50 g	0,004 g
MA100C MA100H	F1	intern	100 g	0,005 g	--- g *(50)*	20/50/70/100 g	0,002 g

MA50-100.XLS

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of the equipment without notice.

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